CLAIMS

1. Surface plasmon microsensor or nanosensor for chemical or biological species (3, 13), characterised in that it comprises pads (2, 12, 22, 32) distributed on the surface of a support (1, 11), the pads comprising at least one electrically conductive material and being capable of immobilising said chemical or biological species, the pads having a dimension less than 1 µm.

2. Microsensor or nanosensor according to claim 1, characterised in that the pads (2, 12, 22, 32) are distributed on the surface of the support (1, 11) according to a two-dimensional matrix.

3. Microsensor or nanosensor according to one of claims 1 or 2, characterised in that the pads have a section in the shape of a circle or an ellipse.

4. Microsensor according to claim 3, characterised in that the section of the pads has its largest dimension between 0.5 µm and 1 µm.

5. Nanosensor according to claim 3, characterised in that the section of the pads has its largest dimension less than 0.5 µm.

6. Microsensor or nanosensor according to one of claims 1 or 2, characterised in that it comprises at least two networks of pads, the shape of

the section of the pads of one of the networks being different to the shape of the section of the pads of the other network.

7. Microsensor or nanosensor according to any of claims 1 to 6, characterised in that said electrically conductive material is gold or silver.

8. Microsensor or nanosensor according to any of claims 1 to 7, characterised in that the pads are formed by the superposition of at least two different metallic layers.

9. Microsensor or nanosensor according to any of claims 1 to 7, characterised in that the pads are formed by the superposition of a metallic layer integral with the support and an ultra thin layer of a material enabling the attachment of chemical or biological species.

10. Microsensor or nanosensor according to any of claims 1 to 9, characterised in that said surface of the support is a surface of a material chosen among dielectric materials, semiconductor materials and metallic materials.

11. Microsensor or nanosensor according to any of claims 1 to 10, characterised in that it further comprises means making it possible to increase the sensitivity of the sensor.

12. Microsensor or nanosensor according to claim 11, characterised in that the means making it possible to increase the sensitivity of the sensor comprise a thin metallic film deposited on said surface of the support.

13. Microsensor or nanosensor according to claim 12, characterised in that a thin dielectric film is intercalated between the thin metallic film and the pads in order to adjust the plasmon resonance as a function of the thickness of the dielectric layer.

14. Microsensor or nanosensor according to claim 11, characterised in that the means making it possible to increase the sensitivity of the sensor comprise a planer wave guide (17) intended to convey a guided electromagnetic mode, said planar wave guide being formed on the surface or under the surface of the support (11) and under the pads (12).

15. Microsensor or nanosensor according to claim 11, characterised in that the means making it possible to increase the sensitivity of the sensor are constituted by the grouping together of pads (18), the distance separating said grouped together pads being sufficiently small to allow an electromagnetic coupling between said grouped together pads.

16. Microsensor or nanosensor according to claim 11, characterised in that, the pads having a section in the form of an ellipse, the means making it

possible to increase the sensitivity of the sensor are constituted by the small distance separating an end of a pad along the major axis of the ellipse from the end of the adjacent pad along the major axis of the ellipse, this small distance enabling an electromagnetic coupling between the pads.

17. Microsensor or nanosensor according to claim 11, characterised in that the means making it possible to increase the sensitivity of the sensor comprise at least one particle associated with a pad.

18. Microsensor or nanosensor according to claim 17, characterised in that said particle is chosen in the group composed of metallic particles and fluorescent particles.

19. Microsensor or nanosensor according to claim 17, characterised in that said particle is a particle (14) fixed to said chemical or biological species.

20. Microsensor or nanosensor according to claim 17, characterised in that said particle (20) is fixed to an object intended to be placed near to a pad.

21. Microsensor or nanosensor according to claim 20, characterised in that said object is the tip (21) of a near field optical microscope.

22. Use of the microsensor or the nanosensor according to any of the previous claims to carry out Raman spectroscopy at the level of the detection by a reading system for the identification of chemical or biological species immobilised on the pads of the microsensor or the nanosensor.